1: Krasheninnikov N-5 (1736-40) 1764 Kamchadal

hours' time. It was the white of an egg, with ſome camphire and ſugar, which he rubbed 'till it foamed upon a pewter plate, then tied it in a handkerchief, and bound it upon the forehead. This he found to ſucceed in every inflammation of the eyes.

132 It hails frequently both in ſummer and harveſt; but I never ſaw the hail bigger than peaſe. It ſeldom lightens but at the ſummer ſolſtice. The thunder is alſo but ſeldom heard, and then ſeems to be at a great diſtance. We have no inſtance of any one killed by thunder: the natives ſay, indeed, that before the arrival of the *Ruſſians* they had a great thunder, and ſome were killed by it; but this is to be queſtioned, ſince for ſo long a time we have had no inſtances of it. As to fogs, it is impoſſible that there ſhould be greater any where than at *Kamtſchatka*; and it is to be queſtioned whether deeper ſnows fall any where between 55 and 52 degrees north latitude than here, from the melting of which the rivers ſwell ſo much as to overflow their banks, and the earth in the ſpring is entirely covered with water. The cold in winter is moſt intenſe about the Great River and the *Awatſcha*; but in the lower *Kamtſchatkoi Oſtrog* it is much warmer than in any other place of *Siberia* in the ſame latitude.

The greateſt inconveniency ariſes from the violent winds and ſtorms, concerning which the following remarks may not be improper. Before a great wind, which generally comes from the eaſt, the air is always thick and dark; but, as I had not a thermometer, I cannot be certain if it is warmer then than at other times. The eaſt winds coming from the *Lopatka*, where are burning mountains and warm ſprings, I imagine that they not only ariſe from the narrowneſs of the land, but alſo from ſubterraneous fires and vapours.

135 258 439 With regard to other advantages or diſadvantages of this country, one may ſay in general, that its greateſt riches conſiſt in plenty of good furs and fiſh, and its greateſt inconveniences in the want of iron and ſalt. The firſt they are ſupplied with from other

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other places, and the ſecond by boiling ſea water into ſalt; but the troubleſome diſtant carriage of the iron, and the boiling of the ſalt, are attended with ſuch expence and difficulty, that they are both ſold at a moſt intolerable price. One cannot buy a common ax under two rubles, and a pound of ſalt coſts four rubles.

CHAP. II.

Of the VOLCANO's *or* BURNING MOUNTAINS.

THERE are three burning mountains in *Kamtſchatka*, the *Awachinſky*, the *Tulbatchinſky*, and the *Kamtſchatka*.

The *Awachinſky* mountain ſtands upon the north ſide of the bay of *Awatſcha*, at a good diſtance indeed, but its bottom reaches to the very bay; and all the high mountains, near one half of their height, are made up, as it were, of rows of hills ſet one upon another, and the top they call the *Shatſe*, or tent, which is always naked, but the lower parts are generally covered with wood.

Theſe mountains for many years throw out a continual ſmoke, but flame only at times. The moſt terrible fire happened, as the *Kamtſchadales* ſay, in the ſummer of the year 1737; but this laſted no longer than 24 hours, and concluded by throwing out a vaſt cloud of aſhes, which covered the adjacent parts the depth of a verſhoke *.

* A verſhoke is the $\frac{1}{16}$ of the *Ruſſian* arſhin, which contains 27 inches.

the place; but this natural phænomenon appeared ſo curious that I returned to examine it. The people of *Shematchinſki* village were obliged to declare the true reaſon why they had not formerly diſcovered them, and much againſt their will were forced to ſhew me the place, but would not go near it: and when they ſaw that we lay in the water, drank it, and eat things boiled with it, they expected to ſee us periſh immediately; but when they ſaw this did not happen, they told it in the village as an uncommon wonder, and were aſſured that we muſt be very extraordinary people ſince even the devils could not hurt us.

This is remarkable, that north from the mouth of the river *Kamtſchatka*, and weſt along the coaſt of the river *Oſernoi*, there are no hot ſprings, although it abounds in *Pyrites*, ſulphur, iron ore, and ſtones that yield alum and vitriol. Mr. *Steller* obſerves, that the appearance of the country of *Kamtſchatka*, and the frequent earthquakes there, give reaſon to think that it is full of caverns replete with combuſtible matter, which taking fire in the bowels of the earth produces earthquakes, and makes thoſe vaſt alterations of which we ſee numerous inſtances in rocky ſhores being torn off both upon the *Beaver* ſea, and in the iſlands which lie between *Aſia* and *America*. The combuſtible matter, he tells us, is kindled by the ruſhing of the ſalt water into thoſe ſubterraneous caverns, through their apertures towards the ſea; which hypotheſis is ſtrengthened by his obſervation that the earthquakes are moſt frequent about the equinoxes, when the waves of the ſea are driven by the great ſtorms with uncommon violence upon the ſhores; and eſpecially about the ſpring equinox, at which time the water always riſes higher than at any other: and the inhabitants of *Kamtſchatka* and the *Kuriles* know this ſo well, that they always fear the beginning of *March* and the end of *September*.

It is very extraordinary, that no iron has been diſcovered here, although ſome ore is obſerved mixed with clay and earth, to which

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which ſulphur being added the ſubterraneous fires may eaſily be accounted for; nor do we yet know of any ſalt ſprings, although the narrowneſs of the iſthmus of the peninſula of *Kamtſchatka*, and ſo many ſubterraneous caverns under the rocky hills which have communication with the ſea, ſhould give us reaſon to conclude that there muſt be ſome.

After the hot ſprings we ought to take notice of the rivers which never freeze. Theſe are ſo common in *Kamtſchatka*, that there is ſcarcely one river which has not ſome very large openings, even in the moſt ſevere froſts; and the plains under the hills are ſo full of ſprings that one cannot go dry any where in the ſummer. Theſe ſprings, which joining make a little rivulet, and fall into the *Kleutchova Kamtſchatka*, never freeze, and yield fiſh almoſt the whole winter, which gives an advantage to the *Kleutchova*, as it furniſhes not only the *Kamtſchadales*, but all the people of the *Oſtrog* of *Niſhniſhantalſky*, with freſh fiſh, which is generally eſteemed, on account of its ſcarcity at that time, as a very great delicacy. This may alſo account for the wholeſomeneſs of all theſe waters, which the inhabitants drink after eating the fatteſt fiſh without the leaſt harm, although, in other places, cold water drunk upon fat fiſh produces the bloody flux.

CHAP.

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CHAP. IV.

Of the METALS *and* MINERALS.

ALTHOUGH the peninſula of *Kamtſchatka* is hilly, and the ground ſuch as might naturally be ſuppoſed to produce metals and minerals, eſpecially iron and copper, with which *Siberia* abounds; yet hitherto little has been diſcovered. This is no proof that ſuch ores are not in *Kamtſchatka*; for, beſides that the *Kamtſchadales* are entirely unexperienced, the *Ruſſians* who live here have as yet given themſelves no trouble in the ſearch after metals; as they have ſuch large quantities of iron and copper inſtruments brought to them, that they have not only ſufficient for themſelves, but are alſo enabled to furniſh the *Kamtſchadales* and *Kuriles* with them at a very conſiderable profit. It is alſo to be conſidered, that the providing for their ſubſiſtance takes up ſo much of their time, that they can ſpare but little for any thing elſe; and moreover, the places proper for ſuch tryals are very difficult of acceſs: to which it may be added, that the frequent ſtorms and general inclemency of the weather are great hindrances to ſuch tryals; eſpecially when every neceſſary for the undertaking muſt be carried upon men's backs, for in the ſummer they can carry nothing upon dogs. It is reaſonable to preſume that ore might be found in *Kamtſchatka*, if it was worth while to ſearch for it. Copper ore has been found about the *Kurilſkoy* lake, and the *Ivovoy* bay; and a ſandy iron ore upon the banks of the ſeveral lakes and rivers; whence it is expected that there is iron ore in the hills from which theſe lakes and rivers riſe. Native ſulphur is gathered about the rivers *Kambalinſkoy* and *Oſernoi*, and the *Kronotzkoy* cape. The ſulphur

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135 phur which they bring from *Olontoſki*, where it drops from the rocks, is quite fine and pellucid; and in the *Pyrites* upon the coaſt it is to be found every where.

The following kinds of earth are common. Great quantities of white chalk are found about the *Kurilſky* lake; tripoly and oker about the Great River, and the villages of *Nachikin* and *Koutchinubiff*; and a purple-coloured earth about the hot ſprings, 135 and ſometimes a hard ſtony oker. Among the ſtones in the 324 mountains are found, but rarely, ſmall cherry-coloured chryſtals; and near the river *Charious* are found pieces of fluſſe, which is like a coarſe green glaſs, of which the inhabitants formerly made knives, axes, lancets, and darts. It is called by the *Ruſſian* natives glaſs, and by the *Kamtſchadales*, *nanagy*. This fluſſe is alſo found in the copper mines about *Ecatherinenbourg*, where it is called a topaz. There is likewiſe here a ſort of light ſtone, white like chalk, of which the inhabitants make plates, and lamps wherein they burn their fiſh oil; and every where upon the ſhore is found an iron-coloured hard ſtone, porous as a ſpunge, and eaſily turned by the fire.

The inhabitants find pellucid ſtones near the ſprings of the river, which they uſe inſtead of flints. Some of theſe ſtones are ſemi-pellucid, whitiſh and milky, and reckoned cornelians by the *Ruſſians*. Some ſmall pellucid ſtones of a yellowiſh colour, like corals, are found upon the banks of ſeveral rivers; and plenty of hyacinths near *Tomſkoy*.

135 Hitherto they have diſcovered no precious ſtones here. The hills 278 are firmer than thoſe in *Siberia*, and do not fall away like them; but when the earth falls off they find much *lac lunæ*; and a ſoft kind of bolus, of a fattiſh creamy taſte, is found near the *Penſchinſka* ſea, *Kurilſkoy* lake, and the *Olutorſkoy*: this is uſed as an excellent remedy in fluxes. I ſent ſpecimens of 135 moſt of the above things to the Muſeum of the Imperial Academy of *St. Peterſbourg*. I muſt not forget to mention that

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that amber is gathered here, near the *Penſchinſka* ſea, upon the river *Tegbil*, and farther north. 135

CHAP. V.

Of TREES *and* PLANTS.

THE moſt uſeful wood is the larch *, and the white poplar †, which ſerves for building their houſes and forts; and they are fit, not only for ſuch boats as the inhabitants uſe, but even for the building of ſhips. The larch-tree, indeed, only grows upon the river *Kamtſchatka*, and ſuch other rivers as fall into it: in other places they make uſe of the white poplar. The pine-tree ‖ and the black poplar ‡ are no where to be found upon the *Kamtſchatka*; and the pitch-tree ** only in one place, and there in ſmall quantities. Although there be many birch-trees ††, yet they make little uſe of them, unleſs in their ſledges, having none near their houſes but what are crooked and uſeleſs; and it is very troubleſome to bring the better ſort from the diſtance at which it grows. 137 313

They make great uſe of the birch bark, which they ſtrip from the trees while yet green; and cutting it in ſmall pieces, like vermicelli, eat it with dried caviar. In the winter, whenever you enter any of their villages, you find the women employed in hacking this green bark with their bone or ſtone axes. They alſo ferment this bark with the juice or ſap of the birch, which makes an agreeable drink. The birches of 314 222 252 273

* Larix. ‖ Pinus. ** Picea.
‡ Populus alba. ‡ Populus nigra. †† Betula.

22: Guillemard T-2 (1882) 1886 Kamchadal

000 we paddled out into the current, and in another ten minutes the village was lost to view.

114 In Findlay's "North Pacific Directory" it is stated, though upon
135 what authority is not clear, that the Kamschatka River "is said to
136 be capable of admitting vessels of 100 tons about one hundred and fifty miles up the stream." This, however, is not correct, or at any rate is very misleading, for the river is beset throughout with sand-banks which in many places apparently lie completely across the stream. Thus, opposite Kluchi village there was only an average of seven feet of water, while both above and below we got depths of twenty or thirty feet and more. The sand-banks also are very unexpectedly placed, and the navigation of the stream by a large vessel, even if possible, could only be accomplished by the aid of an elaborate system of buoys, which, I need hardly say, is not likely to be instituted for many a year to come. From some versts above Kluchi to the mouth of the river, except at the Tchoaki or narrows, to which I shall have occasion to refer presently, many islands are formed by the bifurcation of the stream, some of them of large size, and the river increases considerably in breadth. Opposite the village it is said never to freeze entirely over, a fact the people attribute to the existence of hot springs in the river bed. They also told us that salmon remain here throughout the winter, though not in any great numbers.

Among these islands there appeared to be more duck than we had been lately accustomed to see in the lower part of the river, and we here obtained the Shoveller (*S. clypeata*) for the first time. Landing to replenish the larder at some small lakes towards the hour of sunset, we remarked both snipe and wild geese, neither of which we had previously met with, but it was too dark to dis-
000 tinguish the species. Verglaski followed us on occasions such as these with the stolid expression and steady gait he always affected. Nothing short of a bear, I believe, ever roused him to any less dignified pace than a walk, and as he slowly followed us, I had a lurking suspicion that he regarded our occupation as a rather

27: Sauer--290 T-2 (1789-93) 1802 Kamchadal
116, 133, 134, 135

"From this place [CMC: i.e., north of the village of Apoushinsk, from which point the Kamchatka River is navigable by small craft] the face of the country assumes the appearance of extreme fertility. The valley widens, and the space between the mountains east and west is at Virchni Kamtshatka 40 miles. The soil is deep and rich, composed of black earth, mixed with fine black ashes from the burning mountains, and fine iron sand, which adheres to a magnet, and forges well with bar-iron, but used alone is very brittle."

28: Sarytschew--62 T-1 (1789-90) 1806 Kamchadal
116, 135, 136

"By some beds of rock in this peninsula [CMC: at the entrance to Petropavlovsk harbor], we discovered green jasper marl, on which were the representations of shrubs or trees; we also found, in the crevices of the rocks, some layers of amaranth, not very large, and remarkably thin.

For some time after our arrival, there was no fresh fish to be had. In the beginning of November, we began to catch wachnas in abundance, and occasionally herrings. The wachna, (Gadus æglesinus), is a sort of stock-fish, about half a yard in length, with a roundish body, and three dorsal fins. When taken out of the water, it is perfectly of a copper colour, but soon turns quite pale. Its flesh is white, but soft, and not pleasant to the taste. The roe is, however, of a fine texture, and has the best flavour. It is an inhabitant of the European Ocean, but most frequently found in Kamtschatka."